

SMALL BUSINESS INNOVATION RESEARCH

Proposed FY2021 Contract Topics

NCI Board of Scientific Advisors Meeting

May 12, 2020

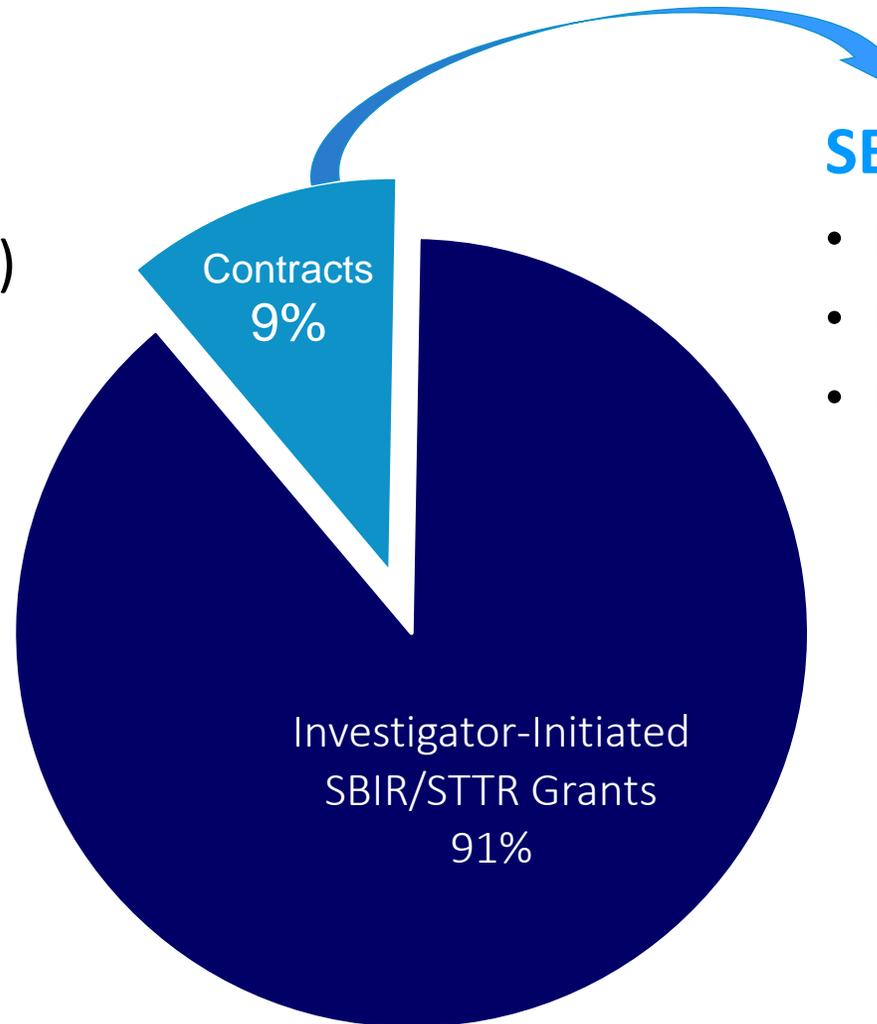
Greg Evans, PhD

SBIR & STTR: Congressional Set-Asides

SBIR: Small Business
Innovation Research (3.2%)

STTR: Small Business
Technology Transfer (0.45%)

\$174M
(FY2019)

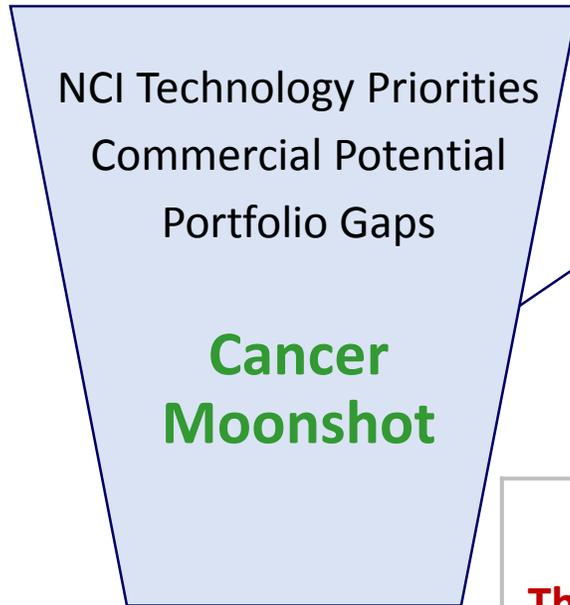


SBIR Contract Topics

- R&D scope defined by the NCI
- New topics once per year
- NIH-wide RFP

Contract Topic Selection Process

22 Concept Ideas



Technology Advisory Groups

1. Therapeutics, Clinical Diagnostics, and Molecular Analysis Techniques
2. Radiation Therapy, Medical Devices, and Information Technology

| | Therapeutics | Medical Devices | Clinical Diagnostics & Molecular Analysis | Information Technology & Bioinformatics | Manufacturing Technologies |
|-----------|--------------|-----------------|---|---|----------------------------|
| 17 | 2 | 2 | 6 | 6 | 1 |

Therapeutics

| Page Topic Title ▪ <i>NCI Division(s)</i> | Overall Goal <i>*Alignment with <u>Cancer Moonshot</u> recommendations</i> |
|--|---|
| 6 Next Generation 3D Tissue Culture Systems with Tertiary Lymphoid Organs ▪ <i>Div. Cancer Biology</i> ▪ <i>Div. Cancer Treatment and Diagnosis</i> ▪ <i>Center for Strategic Scientific Initiatives</i> ▪ <i>SBIR Development Center</i> ▪ <i>Div. Cancer Control and Population Sciences</i> | Goal: Development for IO research purposes of <i>in vitro</i> culture systems for these human lymph node-like structures that form in response to chronic inflammation <i>*[Rec J] Development of new enabling cancer technologies; <u>3D organ-like cultures</u></i> |
| 7 Synthetic Biology Gene Circuits for Cancer Therapy ▪ <i>SBIR Development Center</i> | Goal: Stimulate the engineering of advanced cancer therapies with gene transfer of artificial synthetic biology signaling pathways |

8 Applicator-Compatible Electronic Brachytherapy Sources for Cancer Radiotherapy

- *Div. Cancer Treatment and Diagnosis*

Goal: Development of implantable electronic radiation sources with off switches, free of natural radiation sources

9 Self-Sampling Devices for HPV Testing-Based Cervical Cancer Screening

- *Div. Cancer Prevention*
- *SBIR Development Center*

Goal: Development of user-friendly, high cellular-yield devices to allow women to self-collect cervicovaginal samples for HPV testing

Clinical Diagnostics & Molecular Analysis

10 Quantitative Imaging Software Tools for Cancer Diagnosis and Treatment Planning

- *Div. Cancer Treatment and Diagnosis*

Goal: Commercialization of new or existing academic quantitative imaging software for use by radiologists for common cancer imaging modalities

11 3D Spatial Omics for Molecular and Cellular Tumor Atlas Construction

- *Div. Cancer Biology*
- *Center for Strategic Scientific Initiatives*
- *SBIR Development Center*

Goal: Development for research purposes of scalable imaging technologies that will provide both 3D tumor architecture and single cell -omics information

**[Rec I] Generation of Human Tumor Atlases*

Clinical Diagnostics & Molecular Analysis

12 Understanding Cancer Tumor Genomic Results: Technology Applications for Providers

- *Div. Cancer Treatment and Diagnosis*
- *Div. Cancer Control and Population Sciences*
- *Center for Global Health*
- *SBIR Development Center*

Goal: Software to assist oncology providers in communicating genomic testing results to patients without a genetic counselor

**[Rec A] Establishing a Network for Direct Patient Engagement*

13 Single Cell “Unbiased Discovery” Proteomic Technologies

- *Div. Cancer Treatment and Diagnosis*
- *Div. Cancer Control and Population Sciences*
- *Center for Strategic Scientific Initiatives*
- *SBIR Development Center*

Goal: Development for research purposes of proteomic biomarker discovery approaches to quantify >1,000 proteins in a typical cell

**[Rec J] Development of New Enabling Cancer Technologies; molecular analysis technologies, and mass cytometry for individual cells*

16 Software to Address Social Determinants of Health in Oncology Practices

- *Div. Cancer Control and Population Sciences*
- *SBIR Development Center*

Goal: IT tools to support systematic assessment of social determinants of health, and appropriate referral and followup, in oncology practices

**Cross-Cutting Theme to Reduce Cancer Health Disparities*

17 Digital Tools to Improve Health Outcomes in Pediatric Cancer Survivors

- *SBIR Development Center*
- *Div. Cancer Control and Population Sciences*

Goal: Software to support delivery of high quality cancer survivorship care for children/adolescents

Manufacturing Technologies

22 Advanced Manufacturing to Speed Availability of Emerging Autologous Cell-Based Therapies

- *Div. Cancer Treatment and Diagnosis*
- *SBIR Development Center*

Goal: Improved cell processing methods to expedite and reduce the cost of producing cell-based therapies

Topics from FY20 to be Reissued (6)

14 Quantitative Biomimetic Phantoms for Cancer Imaging and Radiation Dosimetry

- *Div. Cancer Treatment and Diagnosis*

15 Spatial Sequencing Technologies with Single Cell Resolution for Cancer Research and Precision Medicine (**Moonshot*)

- *Div. Cancer Treatment and Diagnosis*
- *SBIR Development Center*

18 IT Tools for Automated Analysis of Physical Activity, Performance, and Behavior from Images for Improved Cancer Health

- *Div. Cancer Control and Population Sciences*

Topics from FY20 to be Reissued (6) cont.

19 Tools and Technologies for Visualizing Multi-Scale Data (**Moonshot*)

- *Center for Strategic Scientific Initiatives*
- *Div. Cancer Biology*

20 De-identification Software Tools for Cancer Imaging Research

- *Center for Biomedical Informatics and Information Technology*

21 Cloud-Based Multi-Omic and Imaging Software for the Cancer Research Data Commons (**Moonshot*)

- *Center for Biomedical Informatics and Information Technology*

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Economic Impact – Study Goals

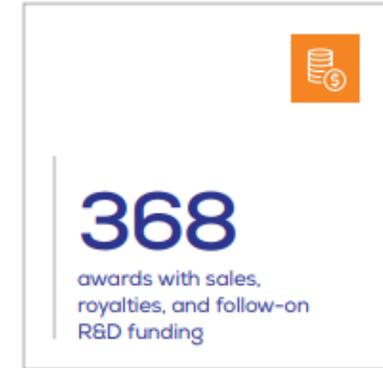
1. Quantify the contribution of the NCI SBIR/STTR program to the U.S. economy
2. Determine key patient and societal impacts resulting from technologies funded by the NCI SBIR/STTR program

Test Cohort

- 690 Phase II SBIR/STTR grant awards
- Awards made between 1998 – 2010
- 444 Companies
- \$787 Million

Study timeline: September 2017 – September 2018

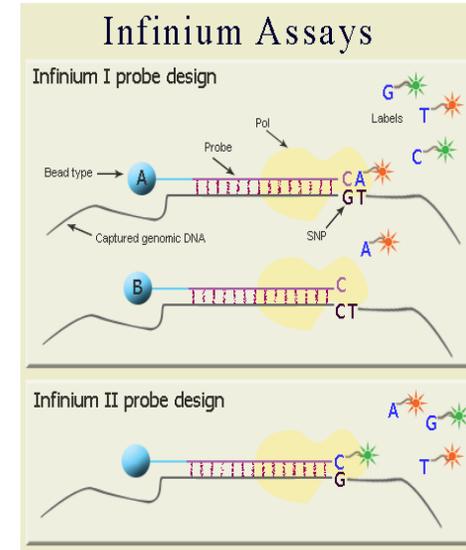
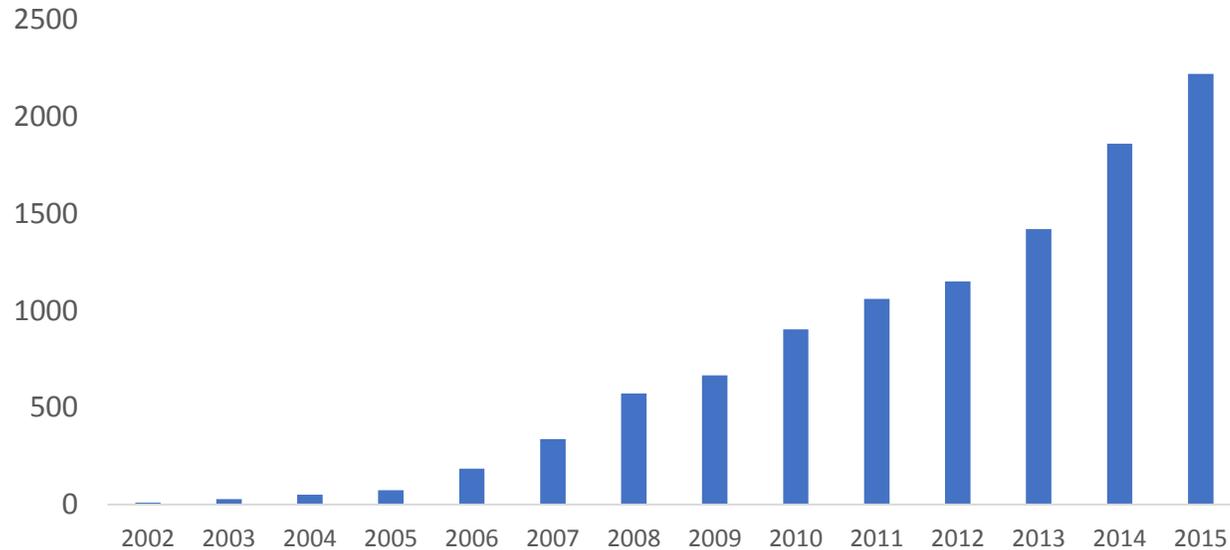
Economic Impact



sbir.cancer.gov/impact

Case: Illumina, Inc.

Illumina Revenue Growth from 2002 to 2015
(in USD million)



Infinium - \$3.5B Sales

Infinium genotyping used for:

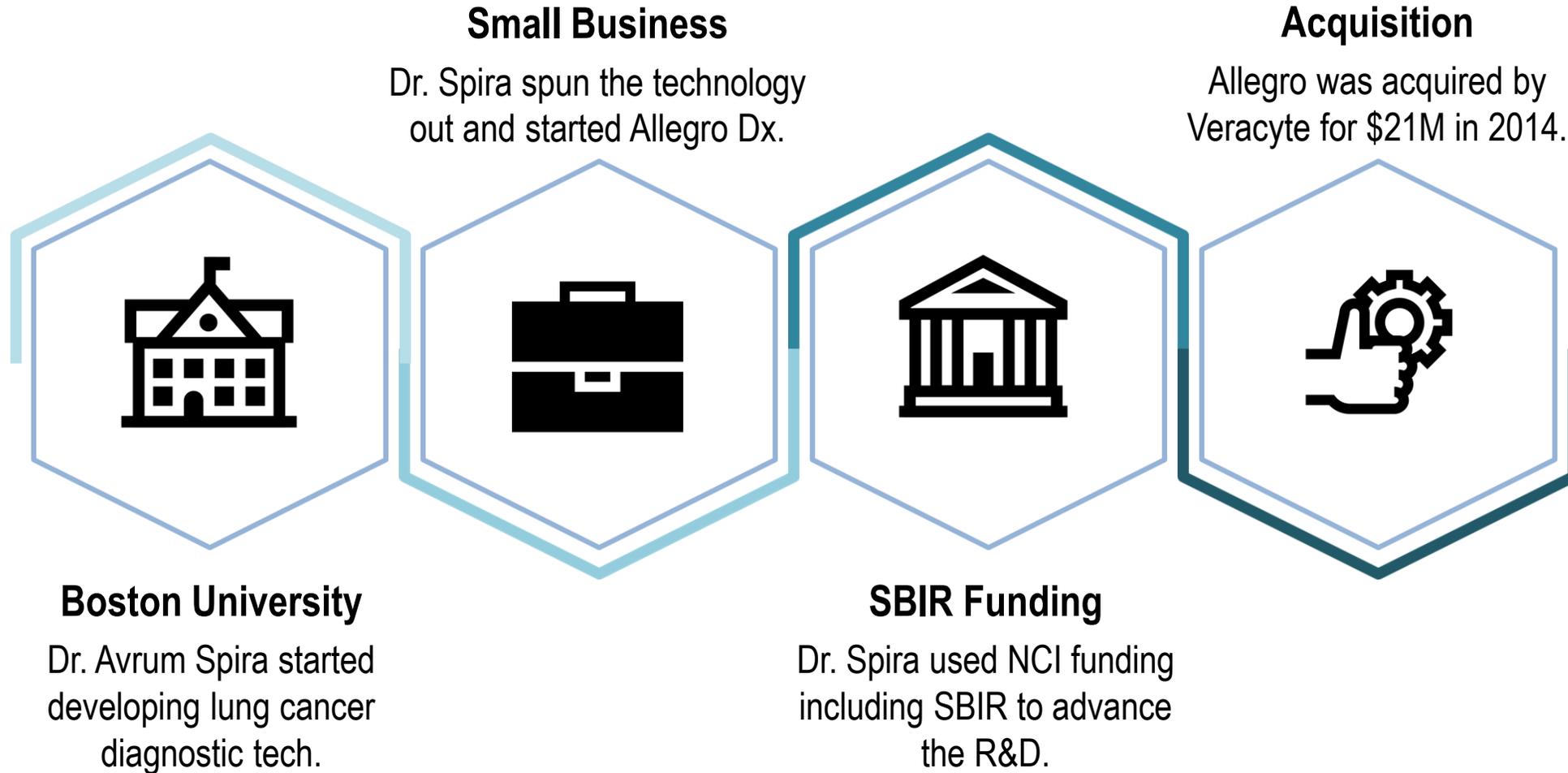
- All of Us Research Program (NIH)
- 23 & Me
- Ancestry.com
- Basic and Clinical Research
- Agriculture Industry

“Illumina used SBIR funding to develop the base technology that went into the Infinium array.... At Illumina, we had at least one project for which we couldn't get SBIR funding because we lost eligibility, and that project never got done. So sometime, projects don't ever start without SBIR funding.”

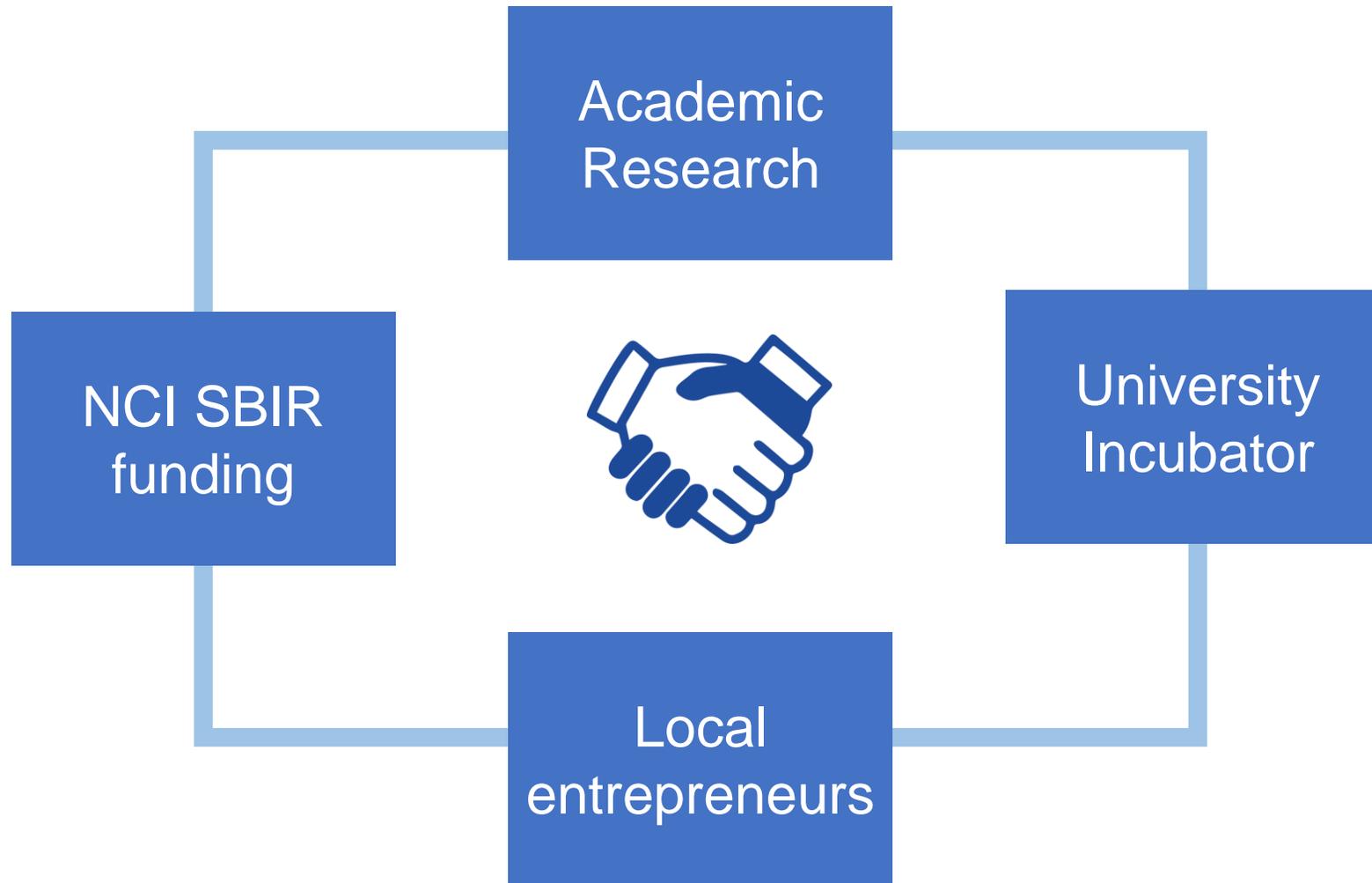
-Kevin Gunderson

PI on Illumina SBIR and creator of Infinium

SUCCESS STORY: Allegro Diagnostics



SUCCESS STORY: Niadyne Pharma



Case: MagArray, Inc.

Early Diagnostics Using Nanotechnology-Based Imaging and Sensing (2007)

Goal

- To develop sensors with improved sensitivity and specificity of genomic and proteomic signatures for early detection and post-treatment monitoring

MagArray

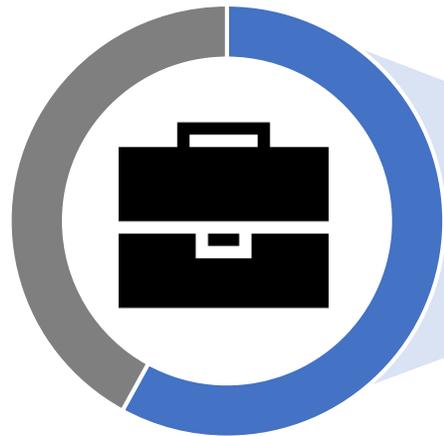
- Phase I contract (2007-2008)
- Phase II contract (2009-2011)
- Phase IIB Bridge grant (2013-2017)

- *Stanford spin-out*
- *Ultrasensitive multiplex immunoassay systems*
- *REVEAL Blood Test for Lung Nodule Characterization (2018)*

IMPACT ON INSTITUTIONS



37% of awards (FY08-17) were subcontracted to NCI-designated comprehensive cancer centers



58% of Phase I awards (FY10-16) went to companies that are less than 5 years old.

Small Business/Academic Collaborations

FY2017 NCI SBIR/STTR

